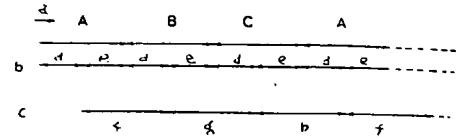


- (54) **COLOR ELECTROOPTIC DEVICE BY FERROELECTRIC LIQUID CRYSTAL**
 (11) 63-85524 (A) (43) 16.4.1988 (19) JP
 (21) Appl. No. 61-230742 (22) 29.9.1986
 (71) SEIKO INSTR & ELECTRONICS LTD (72) SHUNSUKE KOBAYASHI(2)
 (51) Int. Cl. G02F1/133, G09G3/18

PURPOSE: To make color display of distinct hues by setting the emission time of respective colors of a plane light emitting element to start light emission from the 2nd frame of two frames and before the end of the 1st frame of the ensuing two frames.

CONSTITUTION: A picture element desired to emit red light is written white in the 2nd frame of the two frames of the time A. On the other hand, the red light source of the plane light emitting element starts the light emission from the 2nd frame of the time A. The picture element desired to emit blue light is then written white in the 2nd frame of the time B. However, the light emission of the red light source is continued up to the 1st frame of the time B. The light emission of the blue light source is thereafter started from the 2nd frame and the emission of the blue light source is continued up to the 1st frame of the time C where the white is written to the picture element desired to emit green light. The light emission of the green light source is continued from the 2nd frame of the time C. The light emission of the green light source is started from the 2nd frame of the time C and the light emission of the green light source is continued up to the 1st frame of the time A where the white is written to the picture element desired to emit red light and from this time on, the initial procedures are repeated.

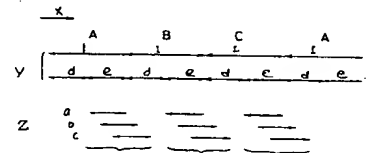


a: time, b: driving timing of SmC*, c: light emission timing of plane light emitting element, d: 1st frame, e: 2nd frame, f: red light emission, g: blue light emission, h: green light emission

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PURPOSE: To make color display without uneven luminance and hues by synchronizing the timings for lighting up and putting out of a plane light emitting element with the scanning signal at the time of rewriting the picture plane of a ferroelectric liquid crystal to decrease the difference in the light quantity of picture elements between the uppermost stage and the lowermost stage.

CONSTITUTION: The picture elements of only the (r) lines from the uppermost stage among (m) lines of matrix picture elements are projected by LEDs of a group (a) and the picture elements of the next (r) lines are projected by the LEDs of the group (b); the same rule also applies thereafter. Supposing that the lighting up and putting out are successively executed with the group (a), group (b), group (c)... in a system for lighting up the monochromatic LEDs from the 2nd frame to the next frame, only the LEDs of the group (a) are lighted up simultaneously with the start of the 2nd frame. The LEDs of the group (b) are lighted up as well after the scanning of the scanning electrodes of the element progresses by the (r) lines thereafter. The LEDs of the group (c) are lighted up as well when the scanning progresses by the next (r) lines. The LEDs down to the lowermost stages are thereafter lighted up in the same manner. The LEDs of the group (a) are put out just before the scanning returns to the picture elements of the uppermost stage. The scanning without having the uneven luminance and hues are thereafter executed in the same manner.



11: light diffusion plate, 13: red LED chip, 14: blue LED chip, 15: green LED chip, d: 1st frame, e: 2nd frame, f: group a, g: group b, h: group c, i: red light emission, j: blue light emission, k: green light emission, l: 2 frames, m: group d, x: time, y: driving timing of SmC*, z: light emission timing of plane light emitting element

RELATED ART (for 63-85525)

It has been conventionally disclosed to realize a color display by using a liquid cell as a shutter with installing a luminous element, such as LED or CRT, behind the liquid cell and utilizing a mixture phenomenon of maintaining and adding. For instance, 7-9 "4 A Full Color Field Sequential Color Display" by Philip Bos, Thomas Buzak, Rolf Vatne et al. disclosed in Eurodisplay '84 (1984/9/18-20), and the article by Hasebe, Kobayashi et al. disclosed in SID '85 are the related arts.

However, the concrete operating method of applying the above system to ferroelectric liquid display element has not been disclosed in any invention.